

Form PTO-1449 (modified)
 List of Patents and Publications
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ATTY. DOCKET NO.
045404.0002

SERIAL NO.
09/838,998

APPLICANT
Gale, *et al.*

FILING DATE
April 20, 2001

GROUP
1626

U.S. PATENT DOCUMENTS

EXAM. INIT.	REF. DES.	DOCUMENT NUMBER	DATE	NAME	CLASS	SUB CLASS	FILING DATE IF APPROPRIATE
	A1	5,808,059	09/15/98	Sessler, <i>et al.</i>			

FOREIGN PATENT DOCUMENTS

EXAM. INIT.	REF. DES.	DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUB CLASS	TRANSLATION YES/NO
	B1	WO 93/13150	07/08/93	PCT			
	B2	WO 89/08092	09/08/89	PCT			

OTHER ART (Including Author, Title, Date, Pertinent Pages, Etc.)

C1	Allen, <i>et al.</i> , "Binding of Neutral Substrates by Calix[4]pyrroles," <i>J. Am. Chem. Soc.</i> , Vol. 118, No. 49, pp. 12471-12472, September, 1996, American Chemical Society.
C2	Andreotti, G., "Crystal and Molecular Structure of Cyclo{quater[(5-t-butyl-2-hydroxy-1,3-phenylene)methylene]} Toluene (1:1) Clathrate," <i>J.C.S. Chem. Comm.</i> , 1005-1007, 1979, The Royal Society of Chemistry.
C3	Asfari, <i>et al.</i> , "Quick Synthesis of the First Double Porphyrin Double Calix[4]arene," <i>Tetrahedron Letters</i> , Vol. 34, No. 4, pp. 627-628, 1993, Elsevier Science Ltd.
C4	Baeyer, A., "Ueber ein Condensationsproduct von Pyrrol mit Aceton," <i>Ber. Dtsch. Chem. Ges.</i> , 19:2184-2185, 1886, The Royal Society of Chemistry.
C5	Beer, <i>et al.</i> , "A Neutral Upper to Lower Rim Linked Bis-Calix[4]arene Receptor that Recognises Anionic Guest Species," <i>Tetrahedron Letters</i> , Vol. 36, No. 5, pp. 767-770, January, 1995, Elsevier Science Ltd.
C6	Beer, <i>et al.</i> , "Anion Recognition by Novel Ruthenium(II) Bipyridyl Calix[4]arene Receptor Molecules," <i>J. Chem. Soc., Chem. Commun.</i> , 1269-1271, 1994, The Royal Society of Chemistry.
C7	Beer, <i>et al.</i> , "Anion Recognition by Redox-Responsive Ditopic Bis-Cobaltocenium Receptor Molecules Including a Novel Calix[4]arene Derivative That Binds a Dicarboxylate Dianion," <i>Organometallics</i> , 14:3288-3295, July, 1995, American Chemical Society.

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ROBERT GERSL

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	A2	6,262,257	07/17/01	Gale <i>et al.</i>			

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	B3	0 233 701	08/26/87	EP			

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C8	Beer, <i>et al.</i> , "Structures of Potassium encapsulated within the 1,3-Alternate Conformation of Calix[4]arenes," <i>J. Chem. Soc. Dalton Trans.</i> , 3479-3485, 1994, The Royal Society of Chemistry.						
C9	Beer, <i>et al.</i> , "Synthesis and Co-ordination Chemistry of a Novel Bis (Benzo Crown Ether) Substituted Calix[4]arene that can Simultaneously Complex Cations and Anions," <i>J. Chem. Soc. Dalton Trans.</i> , 3117-3123, October, 1995, The Royal Society of Chemistry.						
C10	Böhmer, V., "Calixarenes, Macrocycles with (Almost) Unlimited Possibilities," <i>Angew. Chem. Intl. Ed. Engl.</i> , 34:713-745, July, 1995, VCH Verlagsgesellschaft.						
C11	Bonar-Law, R., "Porphyrin Synthesis in Surfactant Solution: Multicomponent Assembly in Micelles," <i>J. Org. Chem.</i> , 61:3623-3634, January, 1996, American Chemical Society.						
C12	Brown, <i>et al.</i> , "The Condensation of Cyclohexanone with Furan and Pyrrole," <i>Canadian J. of Chem.</i> , 49: 4017-4022, 1971, N R C Research Press.						

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ROBERT G. BASS
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C13	Chelintzev, B., and Tronov, V., "Simple condensation of pyrrole with methylethyl ketone and methylhexyl ketone, mixed condensation with acetone and methylethyl ketone, and relation of these reactions to the determination of the formulas of chlorophyll and hemin," <i>J. Russian Physical Chem. Soc.</i> , 48:1197-1209, 1916, Chemical Abstracts only, p. 1418, American Chemical Society.
C14	Chelintzev, V.V., and Tronov, B.V., "Process of condensation of pyrrole and acetone. Constitution of the resulting products," <i>J. Russian Physical Chem. Soc.</i> , 48:105-155, 1916, Chemical Abstracts only, pp. 452-454, American Chemical Society.
C15	Chen, et al., "Synthesis and electrochemical polymerization of calix[4]arenes containing N-substituted pyrrole moieties," <i>J. Electroanalytical Chem.</i> , 393: 113-117, August, 1995, Elsevier Science.
C16	Crescenzi, et al., "The N ₂ O ₂ porphyrinogen skeleton: Access to a novel class of coordinatively unsaturated transition metal ions," <i>Inorganic Chem.</i> , 35:2413-2414, April, 1996, American Chemical Society.
C17	DeAngelis, et al., "A Li ₂ Ti ₂ -substituted acetylene formed from ethylene by reaction with (meso-octaethyl porphyrinogen)titanium," <i>Angewante Chemie</i> , International Edition, English, 34:1092-1094, June, 1995, V C H Verlagsgesellschaft.

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C18	De Angelis, et al., "Solvent-dependent Forms of Lithiated 5,5,10,10,15,15,20,20-Octaethylporphyrinogen in Solution and in the Solid State and Reaction with Tetrahydrofuran," <i>J. Chem. Soc., Dalton Trans.</i> , 2467-2469, 1994, The Royal Society of Chemistry.
C19	DeAngelis, et al., "Organometallic chemistry of a titanium (IV) meso-octaethylporphyrinogen complex: Carrier properties of polar organometallics and their behavior in insertion reactions," <i>Organometallics</i> , 14:4505-4512, October, 1995, American Chemical Society.
C20	DeAngelis, et al., "Oxidation of metal-meso-octaethylporphyrinogen complexes leading to novel oxidized forms of porphyrinogen other than porphyrins. 2. The redox chemistry of iron (II)- and cobalt (II)-meso-octaethylporphyrinogen complexes occurring with the formation and cleavage of two cyclopropane units," <i>J. Am. Chem. Soc.</i> , 116:5702-5713, 1994, American Chemical Society.
C21	DeAngelis, et al., "Oxidation of metal-meso-octaethylporphyrinogen complexes leading to novel oxidized forms of porphyrinogen other than porphyrins. 1. The redox chemistry of nickel(II)- and copper (II)-meso-octaethylporphyrinogen complexes occurring with the formation and cleavage of a cyclopropane unit," <i>J. Am. Chem. Soc.</i> , 116:5691-5701, 1994, American Chemical Society.

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C22	Dennstedt, M., and Zimmermann, J., "Ueber die Einwirkung des Acetons auf das Pyrrol," <i>Ber. Dtsch. Chem Ges.</i> , 20:850-857, 1887, The Royal Society of Chemistry.
C23	Dietrich, <i>et al.</i> , "Macrocyclic Chemistry", VCH, New York, p. 82 and p. 160, 1993, VCH Verlagsgesellschaft.
C24	Floriani, C., "The discovery and future prospects of artificial porphyrins: Molecular batteries functioning with the reversible formation and cleavage of cyclopropane units," <i>Chimia</i> , 50:608-611, December, 1996, Neue Schweizerische Chemische Gesellschaft.
C25	Floriani, C., "The porphyrinogen-porphyrin relationship: the discovery of artificial porphyrins," <i>Chem Commun.</i> , 1257-1263, June, 1996, The Royal Society of Chemistry.
C26	Floriani, C., "Transition metal complexes as bifunctional carriers of polar organometallics: Their application to large molecule modifications and to hydrocarbon activation," <i>Pure and Applied Chem.</i> , 68:1-8, January, 1996, (IUPAC), Blackwell Science Ltd.
C27	Fujimoto, <i>et al.</i> , "Synthesis and Crystallographic Studies of a Calix[4]arene with a 1,3-Alternate Conformation," <i>J. Chem. Soc., Perkin Trans. 2</i> , pp. 643-648, 1992, Royal Society of Chemistry.

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C28	Gale, <i>et al.</i> , "Calix[4]pyrroles: C-rim substitution and tunability of anion binding strength," <i>Chem. Commun.</i> , pp. 665-666, 1997, The Royal Society of Chemistry.
C29	Gale, <i>et al.</i> , "Calix[4]pyrroles: Old Yet New Anion-binding Agents," <i>J. Am. Chem. Soc.</i> , Vol. 118, No. 21, pp. 5140-5141, January, 1996, American Chemical Society.
C30	Gale, <i>et al.</i> , "Calixpyrroles: old yet new anion binding agents," <i>31st Int'l Conf. on Coordination Chemistry</i> , University of British Columbia, Vancouver, Canada, August 18, 1996, publisher unknown.
C31	Gale, <i>et al.</i> , "New Applications for Calixpyrroles," <i>Royal Soc. Chem. U.K. Macrocycles Group Annual General Mtg.</i> , University of Wales, Cardiff, Wales, U.K., December 18, 1996, Royal Society of Chemistry.
C32	Gale, <i>et al.</i> , "Synthesis of a New Cylindrical Calix[4]arene-Calix[4]pyrrole Pseudo Dimer," <i>Tetrahedron Letters</i> , Vol. 37, No. 44, pp. 7881-7884, September, 1996, Elsevier Sciences Ltd.
C33	Ghidini, <i>et al.</i> , "Complexation of Alkali Metal Cations by Conformationally Rigid, Stereoisomeric Calix[4]arene Crown Ethers: A Quantitative Evaluation of Preorganization," <i>J. Am. Chem. Soc.</i> , 112:6979-6985, 1990, American Chemical Society.

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C34	Golder, <i>et al.</i> , "5,10,15,20-meso-tetrakis(3,5-di-t-butyl-4-quinomethide)porphyrinogen: a highly puckered tetrapyrrolic macrocycle from the facile aerial oxidation of a phenolic porphyrin," <i>J. Chem. Soc., Chemical Communications</i> , 1751-1753, 1989, The Royal Society of Chemistry.
C35	Isoz, <i>et al.</i> , "Niobium-carbon functionalities supported by meso-octaethylporphyrinogen and derived macrocycles," <i>Organometallics</i> , 15, 337-344, January, 1996, American Chemical Society.
C36	Jacoby, <i>et al.</i> , "Bifunctional carriers of organometallic functionalities: alkali-metal-zirconium-hydrido, -alkyl, and -allyl derivatives of meso-octaethylporphyrinogen and their reaction with isocyanides," <i>Organometallics</i> , 14:4816-4824, October, 1995, American Chemical Society.
C37	Jacoby, <i>et al.</i> , "Electrophilic activation of aliphatic C-H bonds mediated by zirconium hydride entities and applied to the functionalization of the porphyrinogen periphery," <i>J. Amer. Chem. Soc.</i> , 117:2805-2816, March, 1995, American Chemical Society.
C38	Jacoby, <i>et al.</i> , "Macrocyclic modification using organometallic methodologies. Regiochemically controlled mono- and bis-homologation reactions of porphyrinogen with carbon monoxide assisted by early transition metals," <i>J. Amer. Chem. Soc.</i> , 117:2793-2804, March, 1995, American Chemical Society.

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C39	Jacoby, <i>et al.</i> , "meso-Octamethylporphyrinogen metal complexes: an entry to high valent unsaturated metal centres," <i>J. Chem. Soc.</i> , Chemical Communications, 220-222, 1991, The Royal Society of Chemistry.
C40	Jacoby, <i>et al.</i> , "The π and σ Bonding Modes of meso-Octaethylporphyrinogen to Transition Metals: the X-ray Structure of a meso-Octaethylporphyrinogen-Zirconium (IV) Complex and of the Parent meso-octaethylporphyrinogen Ligand," <i>J. Chem. Soc.</i> , Chem. Comm., pp. 790-792, 1991, The Royal Society of Chemistry.
C41	Jacoby, <i>et al.</i> , "Zirconium meso-octaethylporphyrinogen as a carrier for sodium hydride in toluene: Zirconium-sodium bimetallic hydride and alkyls," <i>J. Am. Chem. Soc.</i> , 115:3595-3602, 1993, American Chemical Society.
C42	Jones, R.L. and Rees, C.W., "Mechanism of heterocyclic ring expansions. Part III. Reaction of pyrroles with dichlorocarbene," <i>J. Chem. Soc.</i> , 2249-2251, 1969, The Royal Society of Chemistry.
C43	Jones, R.L. and Rees, C.W., "Mechanism of heterocyclic ring expansions. Part IV. Reaction of an imidazole, pyrazole and 1,2,4-triazole with dichlorocarbene," <i>J. Chem. Soc.</i> , 2251-2255, 1969, The Royal Society of Chemistry.
C44	Jones, R.L. and Rees, C.W., "Mechanism of heterocyclic ring expansions. Part V. Base catalysed rearrangement of 2-dichloromethyl-2,5-dimethyl-2H-pyrrole and related compounds," <i>J. Chem. Soc.</i> , 2255-2259, 1969, The Royal Society of Chemistry.

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C45	Jubb, <i>et al.</i> , "Preparation and reactivity of the first yttrium porphyrinogen complex," <i>J. Chem. Soc., Chemical Comm.</i> , 2641-2642, 1994, The Royal Society of Chemistry.
C46	Jubb, <i>et al.</i> , "Redox chemistry of <i>meso</i> -octaethylporphyrinogen: Formation and opening of a cyclopropane ring," <i>J. Am. Chem. Soc.</i> , 114:6571-6573, 1992, American Chemical Society.
C47	Jubb, <i>et al.</i> , "Lithium-Transition Metal Complexes Derived from <i>meso</i> -Octaethylporphyrinogen Which Display α - and π - Bonding Modes," <i>Inorganic Chem.</i> , 31:1306-1308, 1992, American Chemical Society.
C48	Kamlet <i>et al.</i> , "Linear Solvation Energy Relationships. 23. A Comprehensive Collection of the Solvatochromic Parameters, π^* , α , and β , and Some Methods for Simplifying the Generalized Solvatochromic Equation," <i>J. Org. Chem.</i> , 48:2877-2887, 1983, American Chemical Society.
C49	Kobayashi, <i>et al.</i> , "A 'calix[4]arene' porphyrin as a new host and an oxygen carrier model," <i>Inorganica Chimica Acta</i> , 224:1-3, 1994, Elsevier Science, Ltd.
C50	Kursanov, N.I., "Cyclohexyl phenyl ether and its isomerization to cyclohexylphenol," <i>J. Russ. Phys. Chem. Soc.</i> , 48:1172-1174, 1916, Chemical Abstracts only, American Chemical Society.

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C51	Marx, T. and Breitmaier, E., "A Porphyrinogen bridged with and a Porphyrin Substituted by 1,8-diethynylantracene," <i>Liebigs Ann. Chem.</i> , pp. 857-858, 1994, V C H Verlagsgesellschaft.
C52	Marx, T. and Breitmaier, E., "Ein Porphyrinogen mit 1,8-Diphenylantracene-Brücke," <i>Liebigs Ann. Chem.</i> , pp. 1041-1042, 1993, V C H Verlagsgesellschaft.
C53	Morzherin, <i>et al.</i> , "Chlorosulfonylated Calix[4]arenes: Precursors for Neutral Anion Receptors with a Selectivity for Hydrogen Sulfate," <i>J. Org. Chem.</i> , 58:7602-7605, 1993, American Chemical Society.
C54	Nagasaki, <i>et al.</i> , "Calix[4]arene-Capped Tetraphenylporphyrin: Synthetic Approach to a Chiral Capped Porphyrin with Regular C ₄ Symmetry," <i>Chem. Letters</i> , pp. 989-992, 1994, The Chemical Society of Japan.
C55	Nagasaki, <i>et al.</i> , "Design and synthesis of a C ₄ -symmetrical hard-soft ditopic metal receptor by calixarene-porphyrin coupling," <i>J. Chem. Soc. Perkin Trans.</i> , 1:1883-1888, August, 1995, Royal Society of Chemistry.
C56	Pappalardo, <i>et al.</i> , "Novel 1,2-Bridged Calix[4]crowns in the 1,2-Alternate Conformation," <i>Tetrahedron Letters</i> , Vol. 37, No. 22, pp. 3907-3910, May, 1996, Elsevier Sciences Ltd.

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C57	Piarulli, et al., "Redox chemistry associated with the compexation of vanadium (V) and tungsten (VI) by <i>meso</i> -octaethylporphyrinogen: Formation and cleavage of cyclopropane units functioning as shuttles of two electrons," <i>J. Am. Chem. Soc.</i> , 118:3634-3642, March, 1996, American Chemical Society.
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C60	Rees, C.W. and Smithen, C.E., "The mechanism of heterocyclic ring expansions. Part II. The reaction of methylindoles with halogenocarbenes," <i>J. Chem. Soc.</i> , 938-945, 1964, Royal Society of Chemistry.
C61	"Removal and recovery of toxic metal ions from aqueous waste streams by utilization of polymer pendant liganda," <i>Internet</i> , Posted October 10, 1995, publisher unknown.
C62	Rosa, et al., "The σ - and π - bonding modes of a tetraanionic porphyrinogen ligand in zirconium (IV) complexes: a theoretical investigation," <i>J. Chem. Soc., Dalton Transactions</i> , 3759-3766, 1993, Royal Society of Chemistry.

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APPLICANT
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FOREIGN PATENT DOCUMENTS

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	C64	Rudkevich, <i>et al.</i> , "Bis(catechol)arene-Zn-tetraarylporphyrins," <i>Tetrahedron Letters</i> , Vol. 35, No. 38, pp. 7131-7134, 1994, Elsevier Sciences Ltd.
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	C70	Von Maltzan, B., "Synthesis of 2,3,7,8,12,13,17,18-octamethyl-porphyrinogen in almost quantitative yield," <i>Angewante Chemie</i> , International Edition, English, 785-786, 1982, V C H Verlagsgesellschaft.
	C71	Xu, <i>et al.</i> , "Inorganic Inclusion Chemistry: A Novel Anion Inclusion System," <i>J. Am. Chem. Soc.</i> , 117:8362-8371, August, 1995, American Chemical Society.
	C72	Dialog Search, March 25, 1997, DIALOG ® Corp.
	C73	Chelintzev, <i>et al.</i> , "Simple condensation of pyrrole with cyclohexanone and other cyclic ketones in mixed condensation with acetone and cyclohexanone, and conclusions in respect to the ability of different ketones to condense with pyrrole," <i>J. Russ. Phys. Chem. Soc.</i> , 48:1210-1221, 1916, Chemical Abstracts only, pp. 1418-1419, American Chemical Society.
	C74	Gutsche, C. David, "Calixarenes," <i>Monographs in Supramolecular Chemistry</i> , ix-xii, Title Page and Table of Contents only, 1989, Royal Society of Chemistry.
	C75	No, <i>et al.</i> , "Synthesis and Molecular Structure of Calix[4]arene Butanoate 1,2-Alternate Conformer," <i>Bull. Korean Chem. Soc.</i> , 17:447-452, 1996, Korean Chemical Society.
	C76	Sessler, <i>et al.</i> , "Calixpyrroles: Old Yet New Anion Binding Agents," <i>XXI International Symposium on Macrocyclic Chemistry</i> , PB 29:158, June 23-28, 1996, publisher unknown.
	C77	PCT International Search Report, Appl. No. PCT/US 97/05643, August 13, 1997.
	C78	Aoyama, <i>et al.</i> , "Multi-Point Interaction of Phosphates with Protonated Pyridylporphyrin Discrimination of Monoalkyl and Dialkyl Phosphates," <i>Chemistry Letters</i> , pp. 1241-1244, 1991, The Chemical Society of Japan.

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C79	Vogel, <i>et al.</i> , "2,7,12,17-Tetrapropylporphycene-Counterpart of Octaethylporphyrin in the Porphycene Series," <i>Angew. Chem. Int. Ed. Engl.</i> , 26, No. 9, pp. 928-931, 1987, V C H Verlagsgesellschaft.
C80	Vogel, <i>et al.</i> , "New Porphycene Ligands: Octaethyl- and Etioporphycene (OEPc and EtioPc) – Tetra- and Pentacoordinated Zinc Complexes of OEPc," <i>Angew. Chem. Intl. Ed. Engl.</i> , 32, No. 11, pp. 1600-1604, 1993, V C H Verlagsgesellschaft.
C81	Pending Application in India; No. 708/MAS/97 to Gale <i>et al.</i> filed April 3, 1997.
C82	Furusho, <i>et al.</i> , "Molecular Design and Functions of Novel Porphyrinogens," 67 th Annual Meeting of the Chemical Society of Japan, Tokyo, Abstract 3D238, 1994 (in Japanese with English translation); The Chemical Society of Japan.
C83	Furusho <i>et al.</i> , "Guest responsive structural changes of porphyrinogen inclusion crystals: a longrange cooperative effect on guest inclusion," <i>Chemical Communications</i> , No. 22, pp. 2205-2206, page vii, and cover page, November 21, 1997, Royal Society of Chemistry.
C84	Gale, <i>et al.</i> , "Calixpyrroles," <i>Chem. Comm.</i> , pp. 1-8, 1998, Royal Society of Chemistry.
C85	Iverson, <i>et al.</i> , "Molecular Recognition of Anionic Species by Silica Gel Bound Sapphyrin," <i>J. Am. Chem. Soc.</i> , Vol. 116, pp. 2663-2664, 1994, American Chemical Society.
C86	Sessler, <i>et al.</i> , "Calix[4]pyrroles: New Solid-Phase HPLC Supports for the Separation of Anions," <i>Chem. Eur. J</i> , Vol. 4, No. 6, pp. 1095-1099, 1998, Wiley-VCH Verlag.

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Application Number	09/838,998
Filing Date	04/20/01
First Named Inventor	Gale et al.
Group Art Unit	1626
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